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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/857,187	06/20/2001	Hikaru Sakamoto	010497	2959

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EXAMINER

RUTHKOSKY, MARK

ART UNIT PAPER NUMBER

1745

DATE MAILED: 01/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/857,187

Applicant(s)

SAKAMOTO ET AL.

Examiner

Mark Ruthkosky

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,2,4 and 7 is/are allowed.
- 6) ☐ Claim(s) 5,6 and 8-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiroshi (JP 03-263,756), and further in view of Rossoll (US 5,336,273.)

The instant claims are to a process for producing a lead-acid battery comprising the step of welding together a lead bushing integrally cast in a lid of an assembled lead-acid battery and a pole inserted through the lead bushing by laser welding wherein both the pole and the lead bushing are made of a lead-calcium based alloy.

Hiroshi (JP 03-263,756) teaches a lead-acid battery with a lead bushing integrally cast in the lid of a lead-acid battery with a Pb-Ca pole inserted through the lead bushing (abstract.) The bushing cup section and pole are formed with a Pb-Ca alloy and are welded together with Pb-Ca alloys. A tab terminal is mounted on the bushing. The pole is provided with a projection at the center of the upper surface (figure.) The reference does not teach the welding to be laser welding.

Laser welding is well described in the battery art for welding materials of a battery (for examples see US 6,193,765 to Nakanishi, JP 35-7103265 to Morinari, JP 40-8293299 to Ogawa, JP 35-9171461 to Watanabe and JP 36-2268055.) In addition, Rossoll (US 5,336,273) teaches

Art Unit: 1745

the sealing of a battery by laser welding wherein a terminal is laser welded to a battery frame.

The frame includes a metal portion on which a metal terminal is welded using a laser. The welding is pulsed (in col. 8, lines 1-35.) It would be obvious to one of ordinary skill in the art at the time the invention was made to use a laser welding technique to weld a lead bushing integrally cast in the lid with a pole inserted through the lead bushing of the lead-acid battery of Hiroshi as laser welding is well known in the art to form a secure weld between the components as taught by Rossoll. Laser welding is known to weld at sufficiently low temperatures so as to not cause damage to the cell components (col. 3, lines 1-20; col. 8, lines 5-55.) Further advantages include high-speed operation; weld bead widths of 10-40 mils and a non-contact process, which avoids the contamination and load on other cell parts. It would be obvious to weld the calcium-lead bushing integrally cast in the lid with the lead-calcium pole inserted through the lead bushing as taught in the lead-acid battery of Hiroshi by a laser welding technique as taught by Rossoll, as laser welding is taught in the art to form a secure weld at sufficiently low temperatures by a high speed, non-contact process to give a secure bond as taught by Rossoll. The artesian would have found the claimed invention to be obvious in light of the teachings of the references.

Allowable Subject Matter

Claims 5, 6, and 8-23 are allowed.

The instant claims are to a process for producing a lead-acid battery comprising a lead bushing integrally cast in a lid of an assembled lead-acid battery and a pole inserted through the lead bushing are welded together by laser welding. Claims 5 and 6 are to a process where the

Art Unit: 1745

welding is performed by a laser beam of low output followed by a beam of high output. Claim 8 is to a process wherein a lap density of beads in the laser welding of the pulsed type is in the range of 6-12 points per mm. Claims 9-13 are to a process wherein terminal portions are surrounded by a lower cylindrical end portion of a cylindrical shield, and fumes generated by welding are sucked through an exhaust port in the shield. The prior art does not include teachings of these features in a process for producing a lead-acid battery comprising a lead bushing integrally cast in a lid of the battery and a pole inserted through the lead bushing wherein the bushing and pole are welded together by laser welding.

Hiroshi (JP 03-263,756) teaches a lead-acid battery with a lead bushing integrally cast in the lid of a lead-acid battery with a Pb-Ca pole inserted through the lead bushing (abstract.) The bushing cup section and pole are formed with a Pb-Ca alloy and are welded together with Pb-Ca alloys. A tab terminal is mounted on the bushing. The pole is provided with a projection at the center of the upper surface (figure.) The reference does not teach the welding to be laser welding. Laser welding is well described in the battery art for welding materials of a battery (for examples see US 6,193,765 to Nakanishi, JP 35-7103265 to Morinari, JP 40-8293299 to Ogawa, JP 35-9171461 to Watanabe and JP 36-2268055.) In addition, Rossoll (US 5,336,273) teaches the sealing of a battery by laser welding wherein a terminal is laser welded to a battery frame. The frame includes a metal portion on which a metal terminal is welded using a laser (in col. 8, lines 1-35.) The prior art does not teach a process for producing a lead-acid battery comprising the step of welding together a lead bushing integrally cast in a lid of an assembled lead-acid battery and a pole inserted through the lead bushing by laser welding, wherein the welding is performed by a laser beam of low output followed by a beam of high output, a lap density of

Art Unit: 1745

beads in the laser welding of the pulsed type is in the range of 6-12 points per mm or terminal portions are surrounded by a lower cylindrical end portion of a cylindrical shield, and fumes generated by welding are sucked through an exhaust port in the shield. As the prior art does not teach a process, as claimed, the instant claims are allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

Applicant's arguments filed 7/6/2004 have been fully considered but they are not persuasive. The applicant argues that Rossoll should not be combined with Hiroshi because Rossoll is not directed to a lead acid battery, but to a cell terminal laser welded to a ceramic frame.

With regard to the applicant's arguments that the combination of references is improper, the examiner disagrees. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) And *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Hiroshi (JP 03-263,756) teaches a lead-acid battery with a lead bushing integrally cast in the lid of a lead-acid battery with a pole inserted through

Art Unit: 1745

the lead bushing, such that the bushing and pole are welded together. Hiroshi (JP 03-263,756) does not teach that the bushing and pole are welded together by laser welding. The method of laser welding is a well-known welding method for joining a terminal component to a casing component of a battery, as taught in Rossoll. It is noted that Rossoll teaches a metal terminal welded to a metal coating on the ceramic frame of the battery (col. 8, lines 10-15, for example.) This is similar to the welding taught in Hiroshi wherein the terminal is welded to the lead bushing embedded in the frame of the battery casing. One of ordinary skill in the art would recognize from these teachings that laser welding will join and secure the lead busing to the lead terminal in a lead acid battery. As welding of the components is taught by Hiroshi, one of ordinary skill in the art would recognize that laser welding provides an equivalent means to weld and secure the components welded in the lead acid battery of Hiroshi.

The applicant argues that the Hiroshi teachings of using a Pb-Ca alloy as a welding material causes an unsatisfactory appearance that may require finishing work and that using laser welding will result in an improved terminal section. These results are not unexpected as Rossoll teaches that laser welding is taught in the art to form a secure weld at sufficiently low temperatures by a high speed, non-contact process to give a secure bond. Welding at lower temperatures will prevent heat damage to battery components, while the non-contact process will result in less contamination to the battery allowing for a superior appearance.

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 571-272-1291. The

Art Unit: 1745

examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:30.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mark Ruthkosky

Primary Patent Examiner

Art Unit 1745

Mark Ruthkosky
12/6/04